

New Year's Eve Storm

December 31, 2009

Summary

A low-pressure system was centered well offshore (around 140 degrees West) on Thursday, Dec. 31, 2009. Despite its distance away from the coast, the system created a large area of warm-frontal precipitation across the Pacific Northwest. The primary forcing for rising motion with the storm was lift due to warm-air advection. In the NWS Pendleton forecast area, snow began in southwest Deschutes County around 4 am PST Thursday morning. During the day Thursday the precipitation spread north and east across the Pendleton forecast area, with higher amounts of snow accumulating along and near the east slopes of the Oregon and Washington Cascades.

The system's cold front crossed the Pacific Northwest Friday Jan 1, 2010. A slightly unstable air mass allowed convection to develop along the front in the southern Columbia Basin. Convective rising motions created pea-size hail and sinking motions created gusts up to 60 mph.

Precipitation Types

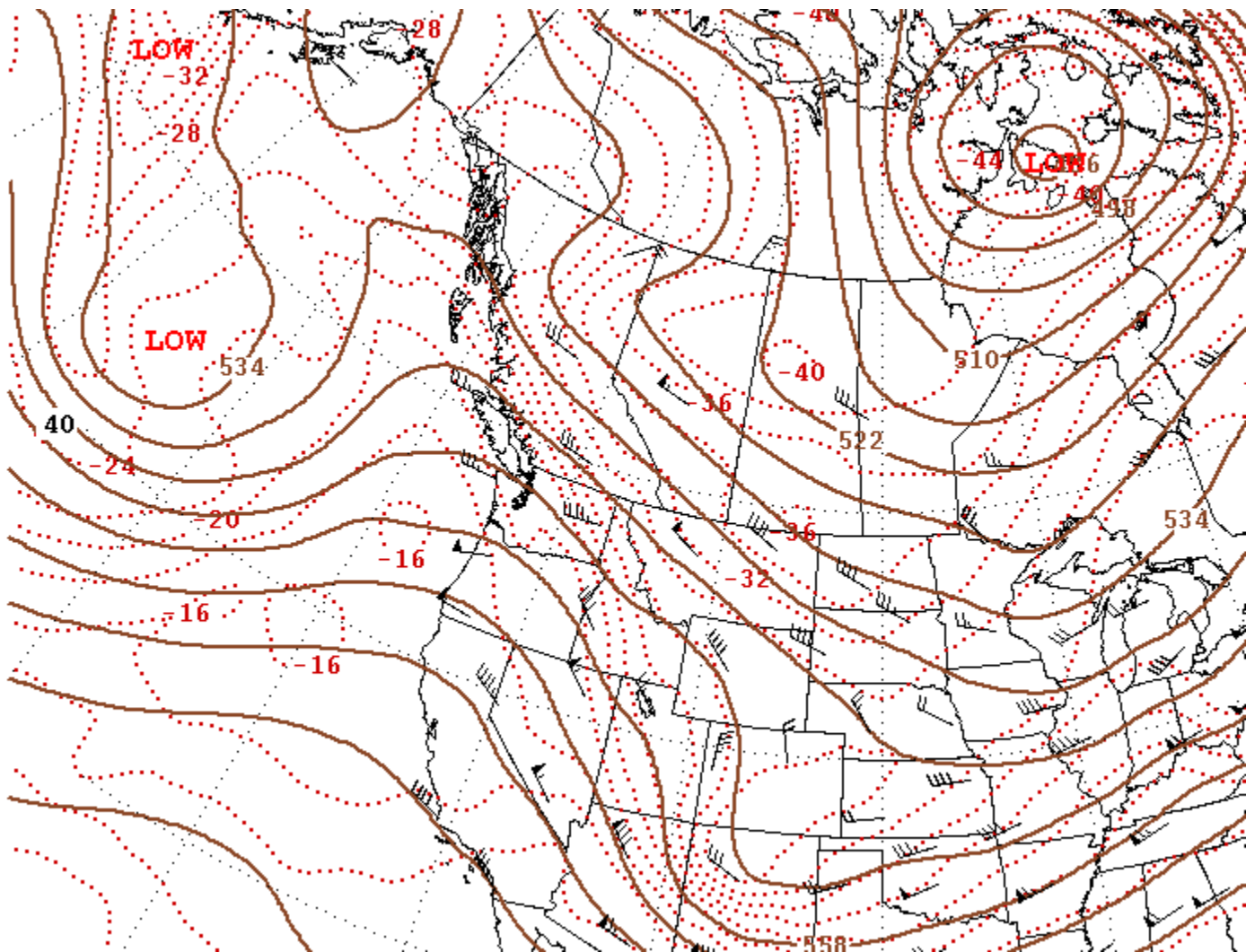
Precipitation began as snow for most locations. During the day Thursday and overnight Thursday night, warm air continued to move across the Pendleton forecast area. In Deschutes County snow levels rose to around 4500 feet by Thursday afternoon and to around 5500 feet by Friday morning. North of Deschutes County and especially in the Columbia Basin the warm air moved over cold air trapped at low levels. For many locations in the southern portions of the Columbia Basin and especially in the Walla Walla valley, freezing rain occurred when the warm, moist air created a melting layer above the trapped cold air. North and west of the Tri-Cities, WA, the melting layer was not significant and most locations continued to receive snow into Thursday evening.

Storm Reports

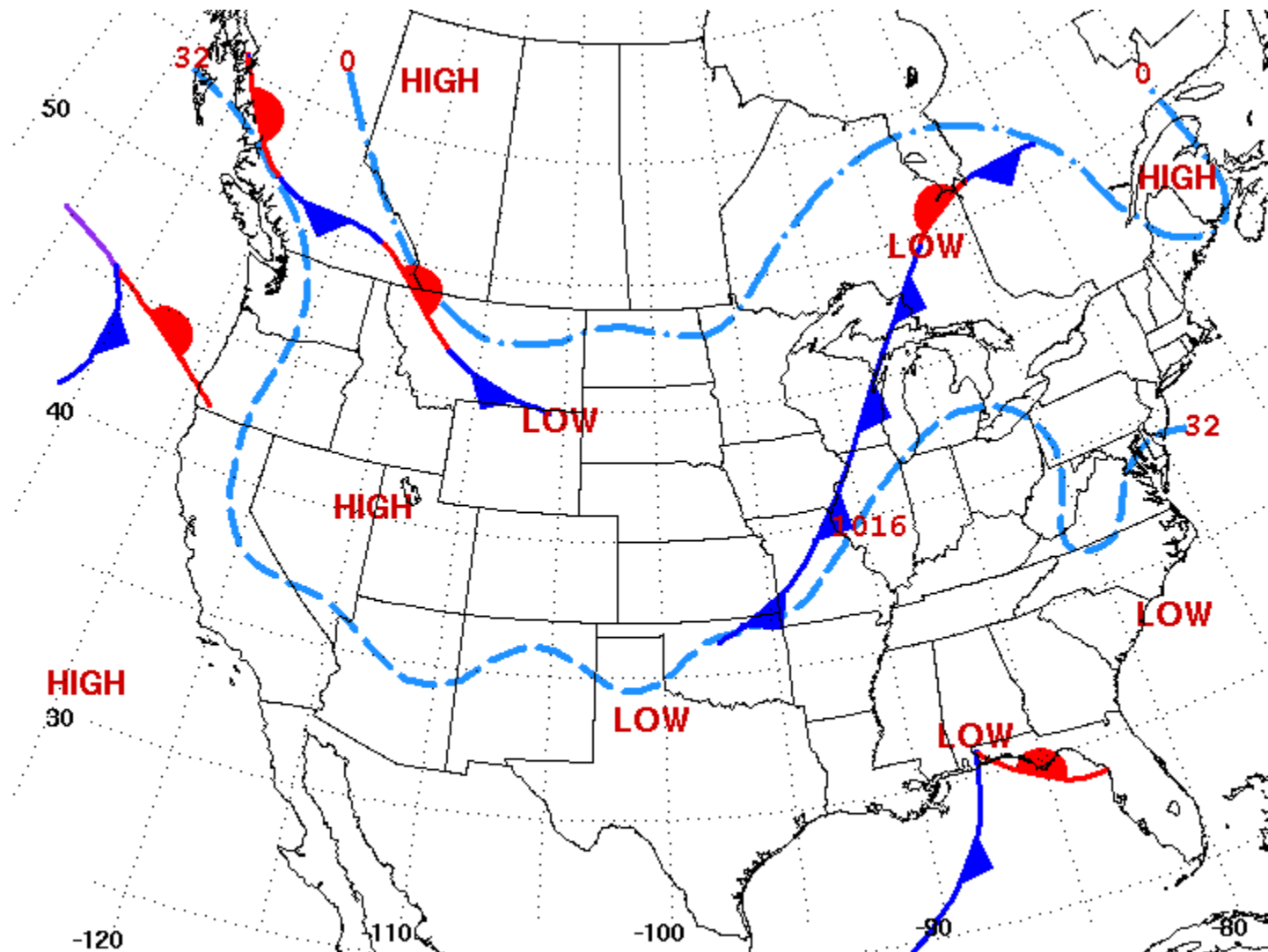
[Click here for a summary of storm reports from the New Years Eve winter storm.](#)

Figures

The figure below shows the weather pattern at around 18,000 feet MSL at 4:00 am PST Thursday, Dec. 31. The location of the low-pressure system offshore is labeled LOW. The low-pressure center remained well off shore Thursday as the “warm sector” of the storm moved northward across the Pacific Northwest.

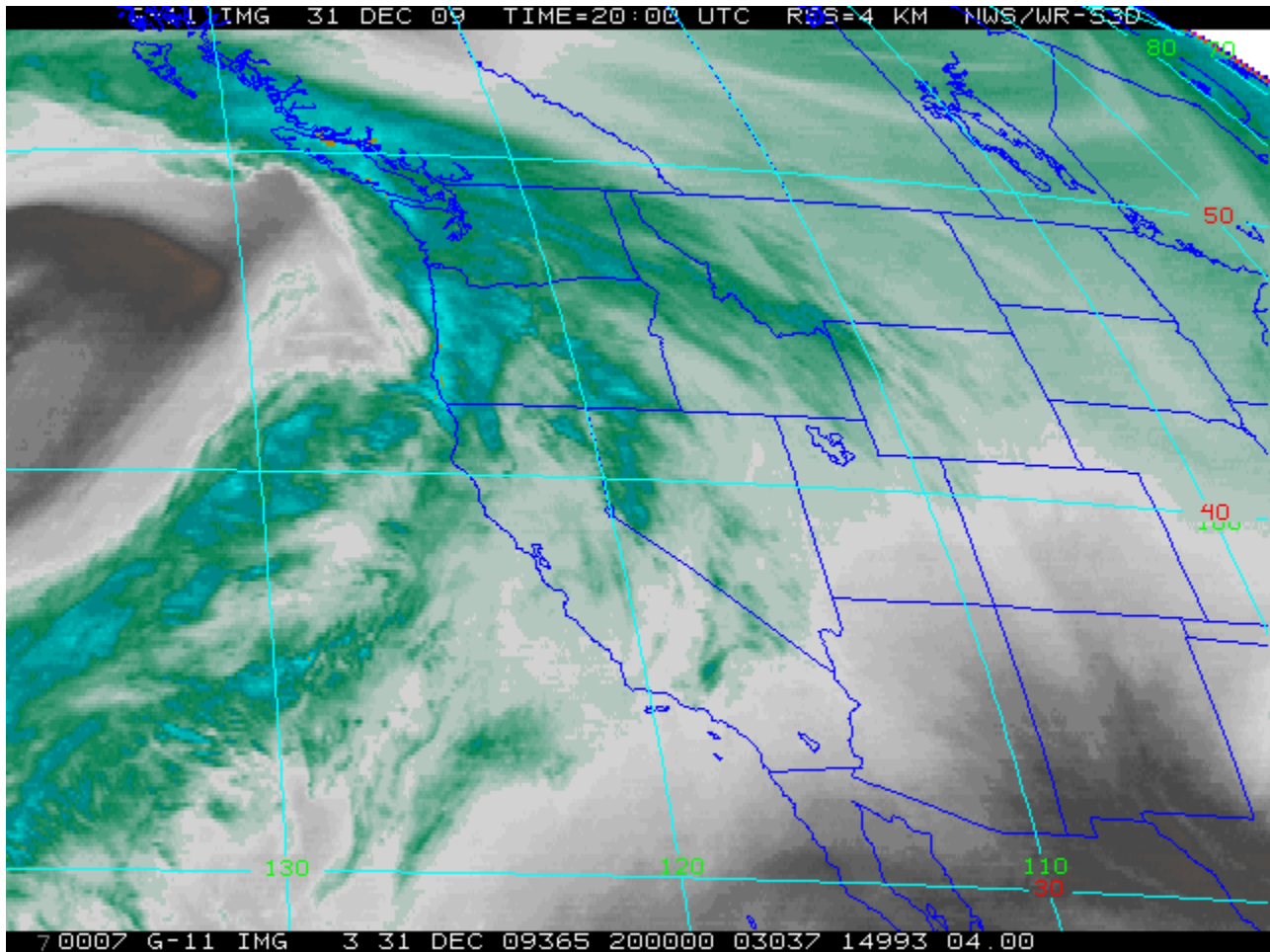


The next figure shows the location of the surface warm front (red line and half circle) located off the Oregon coast at 4:00 am PST Thursday morning, about the time that snow began in southwest Deschutes County.

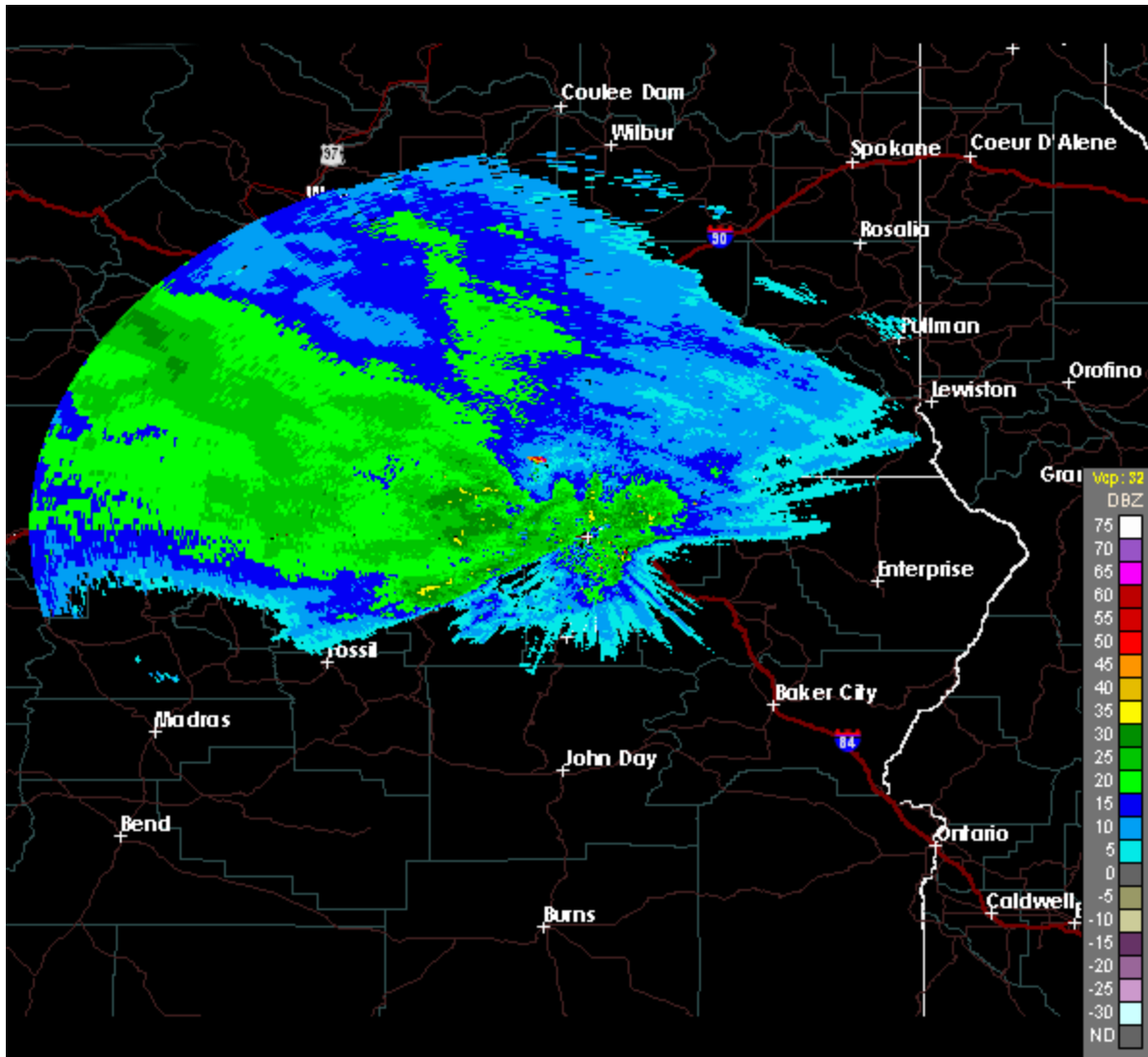


Surface Weather Map at 7:00 A.M. E.S.T.

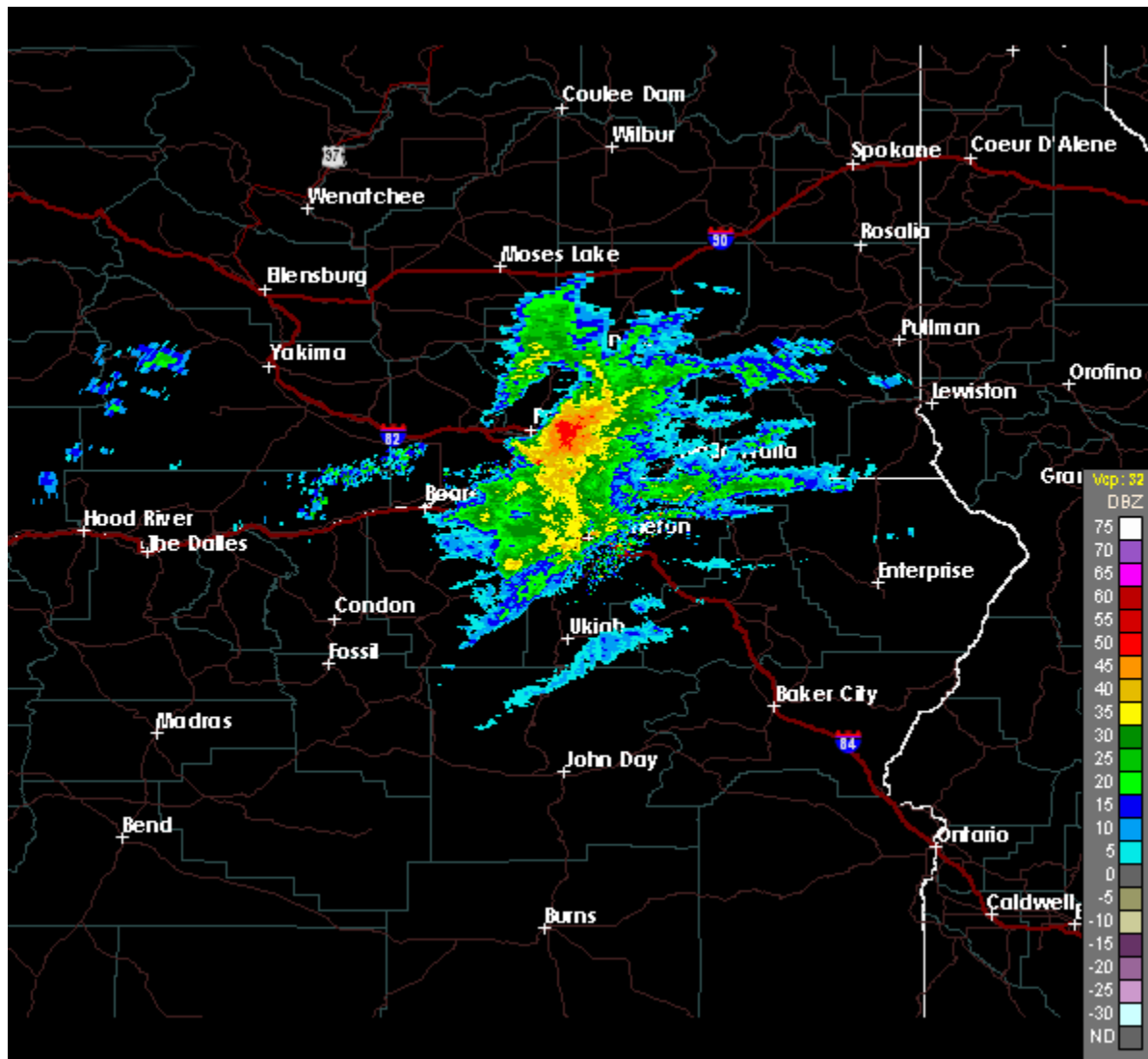
The satellite image below shows water vapor in the atmosphere at noon Thursday. Higher amounts of water vapor are shaded green and the highest amounts are shaded light blue. Light blue shading indicates areas of rising motion and very moist air in upper levels of the atmosphere. At mid-levels, moist air had already spread into eastern Washington (as shown in the radar image below).



The radar image below is from noon Thursday. Blotches of yellow shading show that heavier precipitation has moved into eastern Washington by noon. (Note: radar images are often misleading when showing winter precipitation. Because the radar beams are pointed upward and winter precipitation is shallow, the radar does not “see” the precipitation that is some distance from the radar. In this case precipitation at noon was ongoing in central Oregon but is not detected by the radar.)



The system's cold front crossed the Pacific Northwest Friday Jan 1, 2010. A slightly unstable air mass allowed convection to develop along the front in the southern Columbia Basin. Thunder was heard in Pendleton, OR. Convective rising motions created pea-size hail and sinking motions created gusts up to 60 mph. The figure below shows an image from the Pendleton radar at 1:00 pm PST, Friday. The red shading indicates an area where the radar was likely detecting small hail held aloft by the convective updraft. The storm's downdraft reached the Pendleton airport at this time (1:00 pm PST) creating wind gusts of 60 mph. One half hour later the gust front reached the Walla Walla airport where gusts up to 54 mph were observed.



[Click here for storm reports from the convection on Jan. 1, 2010.](#)